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Andrijana Mušura Gabor, Ph.D.*

Anita Knezović, Ph.D. candidate**

DECISION MAKING STYLES OF INVESTORS IN CAPITAL MARKET

STILOVI ODLUČIVANJA ULAGAČA NA TRŽIŠTU KAPITALA

ABSTRACT: The question of investor rationality has been deeply challenged by the development of behavioural finance, which leads to a distortion of certain axioms underlying the classical economic science. This paper explores investors' decision-making style in the capital market in Croatia and their tendency to framing. This is a search for individual differences in decision making process and research of deviations from rationality assumptions as well. The analysis of investors' decision-making styles points to, in general, the dominance of rational decision making style - vigilance. Individual differences reveal that professional, more experienced investors and investors who trade in domestic as well as in foreign markets score higher on rational self-assessed decision making style.

KEY WORDS: decision making, framing, investors, behavioural finance.

JEL Classification: G02, G11, G14

SAŽETAK: Razvojem bihevioralnih financija sve više se dovodi u pitanje racionalnost ulagača i narušavaju se pojedini aksiomi na kojima se temelji klasična ekonomska znanost. Ovaj rad istražuje stilove odlučivanja ulagača na hrvatskome tržištu kapitala i njihovu sklonost uokviravanju. Obuhvaća istraživanje individualnih razlika prilikom odlučivanja kao i istraživanje odstupanja od pretpostavki racionalnosti. Analiza stilova odlučivanja ulagača ukazuje, općenito, na dominantnost opreznosti kao racionalnoga stila odlučivanja. Pojedinačne razlike otkrivaju da profesionalni, iskusniji ulagači i ulagači koji trguju na domaćem, kao i na stranom tržištu, sebe smatraju racionalnijima.

KLJUČNE RIJEČI: donošenje odluka, framing, investitori, bihevioralne financije.

* Andrijana Mušura Gabor, Ph.D., Zagreb School of Economics and Management, Jordanovac 110, Zagreb, Croatia

** Anita Knezović, Ph.D. candidate, Croatian Financial Services Supervisory Agency, Miramarska 24, Zagreb, Croatia

INTRODUCTION

A long-held assumption that investors represent a rational market agent has been repeatedly refuted by behavioural analysts in recent decades. The irrationality of investor behaviour in the capital market when making investment decisions calls for a careful analysis, especially in the period following a financial crisis such as the financial crisis of 2008. Over the last four decades, behaviour analysts have shown that people make decisions by deviating from the normative models and the basic axioms of utility theory. Furthermore, as a result of human irrationality, the same research on observed systematic biases indicates a descriptive decision making approach. This paper is intended to contribute to the growing field of literature about the irrationality of investors in the capital market and systematic biases which stem from bounded rationality and investors' preference for mental shortcuts when making decisions.

The main research goal of this paper is to provide insight into the decision-making style of investors in the Croatian capital market and to estimate the level of resistance to framing.

The specific problems we will try to address in this paper are the following:

1. Identify investors' decision-making style;
2. Analyse the relationship between the self-assessed level of rational decision-making and the observed style of decision-making;
3. Determine the level of resistance to framing and its relation with the style of decision-making;
4. Analyse the existence of some individual differences with relation to the style of decision-making and resistance to framing.

The paper is structured as follows. The next section provides a review of the literature. The third section presents the methodology, while the fourth presents survey results, descriptive analysis and a discussion of the results. The concluding section highlights specific information on investors in the Croatian capital markets.

THEORETICAL BACKGROUND AND LITERATURE REVIEW

Behavioural finance background

The fast and intensive development of behavioural economics and related fields led to a strong upsurge of research studies and publications aimed at refuting the standard economic rationality theory. Behavioural finance, as a subfield of behavioural economics applied to capital markets, developed as an alternative to the efficient market hypothesis - EMH (Schleifer, 2000). EMH has been the central financial theory since its development in 1970s. Its basic tenet is that security prices always fully reflect the available information (Fama, 1970). The theoretical assumptions of EMH, however, have been repeatedly empirically challenged. Moreover, alternative theories have successfully explained the deviations from EMH and all of the anomalies. It seems that deviations from rationality and

market efficiency assumptions are not as random and non-systematic as was assumed. On the contrary, we now have a plethora of evidence that errors are both systematic and pervasive. Nevertheless, most of the research dealing with errors of judgment focuses on the overall susceptibility to biases and fallacies rather than on individual differences. Generally speaking, and to our best knowledge, studies that explore various individual differences in investors' susceptibility to biased reasoning are rather scarce. They concentrate on a small number of heuristics, their research design includes few individual differences or their methodology has major flaws. However, some research indicates the existence of individual factors that contribute to more or less biased reasoning.

Individual differences in investor behaviour

Having reviewed a large amount of research data, Barber and Odean (2013) gave us a valuable and concise summary of articles on the performance of individual investors concluding that 'individual investors make systematic, not random, buying and selling decisions'¹. They particularly emphasized the disposition effect as the most common form of behaviour of individual investors: individual investors tend to sell winning investments too early while holding on to their losing investment too long. They concluded that many individual investors 'hold poorly diversified portfolios, resulting in unnecessarily high levels of diversifiable risk, and many are unduly influenced by media and past experience.'²

Although investors err in their judgment, some research suggested that not all investors are the same. Hon-Snir, Kudryavstev and Cohen (2012) analyzed the effects of five well-documented behavioural biases on the decision-making process of investors in the capital market: disposition effect, herd behaviour, availability heuristic, gambler's fallacy and hot hand fallacy. Moreover, individual differences could be related to the degrees of these effects. As regards investors' experience, they found that more experienced investors, professional and non-professional, are less affected by behavioural patterns. Regarding gender, they documented 'that female investors are more strongly affected by all the five behavioural biases'.³ Trading experience seems to be an important determining factor for Anderson and Sunder (1995) too: the bias for experienced professional traders trends toward zero. Bayesian model is a better predictor of prices in their opinion. On the other hand, individual investors trade too much, maintain undiversified portfolios, hold losing positions too long, require a risk premium for idiosyncratic risk, and overinvest in their own companies' stock (Blume & Friend, 1975; Ferris, Haugen & Makhija, 1998; Odean, 1998; Barber & Odean, 2000; Grinblatt & Keloharju, 2001; Cohen; Green & Rydquist, 1997; Huberman, 2001).

Barber and Odean (2008) argue that professional investors are less prone to indulge in attention-driven purchases, and with more time and resources at hand, they are able to continuously monitor a wider range of stocks. Schiller and Pound (1989) researched the influence of word of mouth among professional institutional investors as opposite to random walk. As far as the Croatian capital market is concerned, Gamulin (2011) conducted

¹ *Ibid*, pp. 1534.

² *Ibid*, pp. 1565.

³ *Ibid*, pp. 57.

a research study in which he gathered information from a sample of Croatian investors to measure susceptibility to different heuristics and biases. She found that the majority of investors make judgment errors most of the time, but nevertheless, more experienced and professional investors err less (Gamulin & Mušura Gabor, 2016).

Decision making styles and framing

Taking all these research findings into consideration, there is a rationale for assuming individual differences and greater “rationality” of certain investor profiles. Since research investigating the nomological network around investors’ rationality is lacking, this and similar studies represent little pieces of puzzle helping us to better understand the dynamics of investor’s judgment. Due to the complexity of individual investors’ behaviour and the inability to measure it objectively, researchers tend to rely on subjective measures and self-evaluations. Therefore, to assess certain subjective measures of rational behaviour, we used the Flinders Decision-Making Questionnaire DMQ (Janis & Mann, 1977; Mann, 1982) and, as an objective measure of rational judgment, we employed Resistance to framing questionnaire developed by De Bruin, Parker and Fischhoff (2007). DMQ identifies one rational decision making style and 5 others. DMQ measures 6 dimensions of decision-making style: 1) Vigilance - decision-making pattern that is aligned with rational decision-making; 2) Hypervigilance - “panic-like” state characterized by emotional excitement, perseveration, and limited attention where decision-maker impulsively seeks for immediate relief for his severe emotional stress; 3) Defensive Avoidance - associated with incomplete and often biased evaluation of information, escaping conflict by procrastinating, shifting responsibility etc.; 4) Procrastination - associated with postponing decision-making; 5) Buck-passing - leaving decisions to others and avoiding responsibility; and 6) Rationalisation - embodied in mental evasion. Participants in the studies conducted by Janis and Mann’s (1977) and Mann et al. (1997) revealed Vigilance as the dominant decision-making style while Procrastination was the least expressed style.

Framing, as a phenomenon that reflects a deviation from the rationality assumption, is considered a part of automatic thinking process and indicator of context dependency; greater resistance to framing points to greater rationality. The basic principle of framing is passive acceptance of given formulation. Because of this, people are unable to consider all equivalent descriptions of a given option. Tversky and Kahneman (1981, 1984) showed how different framing of outcomes in the area of gains and losses actually violate the basic axioms of utility theory: invariance and, indirectly, dominance. Within the context of rationality models, this means that decisions will be influenced by the factors that affect the accessibility of different situational features, leading to narrow framing, choice bracketing and mental accounting (Kahneman, 2003). Resistance to framing questionnaire is a part of the Adult Decision-Making Competence (A-DMC) questionnaire that measures ‘whether value assessment is affected by irrelevant variations in problem descriptions’ (De Bruin *et al.*, 2007, 941). Research results of De Bruin *et al.* confirmed the previous findings of Stanovich and West (2000) that ‘Resistance to Framing is unrelated to real-world decision outcomes and effective decision-making styles’.⁴

⁴ *Ibid*, pp. 949.

METHODOLOGY

Participants and procedure

Research was conducted during November and December 2013. Participants were contacted through e-mail letters containing the link to the web survey. The sample was non-probabilistic in combination with the “snowballing” method. Participants were recruited by contacting investment firms, investment funds, some banks and private contacts. Contacts who decided to take part in the survey were asked to forward the request to their colleagues. The main criterion for the participant selection was experience in investing. The participation in the study was voluntary and anonymous. One hundred and twenty-five (N=125) investors participated in this research study.

Survey design

The survey was created online using the online survey builder Kwiksveys.com. It involved individual as well as professional investors, divided according to gender, age and educational level. It consisted of general questions related to investment characteristics: number of years of experience in the capital market, investment market (domestic and foreign) and investment type. With regards to gender, 74% of the respondents were males and 26% females. The most represented age categories were between 25 and 35 years of age (54%), followed by the group aged between 36 and 45 (36%) while about 9% were in the 46 to 65 category. Half of the participants had some kind of college degree (46%), and about the same percentage had a master or a doctoral degree (46%) while 5% had only a high school degree.

The sample of investors consisted of 69% individual investors and 29% professional investors. The majority of investors had more than five years of experience in trading (70%). The rest had a maximum of 5 years of trading experience. More than half of the investors were trading only in the domestic market (53%) while 46% have traded both in the domestic and foreign market. The great majority of investors in this sample were trading with shares (82%), only 12% had units in funds and 6% invested in other forms of financial instruments.

The survey also included one item devoted to self-assessment of rational decision-making, 31 questions from the decision-making questionnaire DMQ (Jannis & Mann, 1997) and 7 questions from resistance to framing questionnaire (De Bruin et al., 2007). The scale used for assessing DMQ items was a Likert 5-point scale while for Resistance to framing a 6-point scale was used.

Instrument validity

DMQ measures 6 dimensions of a decision-making style: 1) Vigilance (e.g. ‘When making decisions I like to collect lots of information’, Mann et al., 1997, 3); 2) Hypervigilance (e.g. ‘I feel as if I’m under tremendous pressure when making decisions’); 3) Defensive Avoidance (e.g. ‘I avoid making decisions’); 4) Procrastination; 5) Buck-passing (e.g. ‘I prefer to leave decisions to others’); and 6) Rationalisation (e.g. ‘After a decision is made I spend a lot of time convincing myself it was correct’). DMQ consisted of 6 dimensions

or subscales. Each subscale, except Vigilance, was measured using 5 items and Vigilance with 6 items. The scores for each subscale were calculated as an average score for the items representing each decision-making style. Before that, we assessed whether the subscales had satisfactory reliability (Table 1). All subscales, except Rationalisation, had acceptable levels of reliability. Therefore, one needs to be careful when interpreting the data related to this style of decision-making.

Table 1: Descriptives and alpha reliability coefficients for DMQ subscales

DMQ Subscale	Alpha	Mean	SD
Vigilance	0,73	3,73	0,69
Hypervigilance	0,72	2,22	0,60
Defence avoidance	0,72	1,87	0,67
Procrastination	0,77	1,83	0,69
Buck-passing	0,79	1,85	0,70
Rationalisation	0,64	2,24	0,67

Resistance to framing questionnaire consisted of 7 positively framed hypothetical situations with two possible answers offered. These answers had the same statistical value but differed in frames used. Each framing situation was evaluated using a 6 point scale where value 1 indicated one suggested option and value 6 the other suggested option. Values 1, 2 and 3 indicated favouring the positive, riskless option, while values 4, 5 and 6 indicated favouring the risky option. 'Because the

6-point scale lacks a midpoint, it forces respondents to express a relative preference between options, if only weakly.' (De Bruin et al., 2007, 941). For example:

Imagine that recent evidence has shown a pesticide was threatening the lives of 1,200 endangered animals. For the gain version, two response options have been suggested: If Option A is used, 600 animals will be saved for sure. If Option B is used, there is a 75% chance that 800 animals will be saved, and a 25% chance that no animals will be saved.

Which option do you recommend? Option A 1 2 3 4 5 6 Option B

RESULTS AND DISCUSSION

Our first problem centres around the question of decision-making style, but before answering the first research problem we asked the participants to assess the truth of the following statement "Decisions about investing are made completely rationally". The average self-assessed rationality score was 3,7 ($x=3,656$, $sd=0,685$). If we assume the normal distribution of rationality, this average level was higher than the scale average.

As shown in Table 1, our sample of investors opted for Vigilance as their dominant style of decision-making, which confirms the research results from Janis and Mann's (1977) and Mann *et al.* (1997). Since this style is the only one resembling sound and rational decision-making, we can conclude that the dominant style of decision-making is the rational

style with the highest average score amongst all the styles measured ($x=3,73$, $sd=0,69$). This style of decision-making is the only one with a significant positive correlation with self-assessed rationality ($r=0,308$, $p<0,01$). The least stated decision-making styles were Procrastination, Buck-passing and Defensive Avoidance (Table 1).

Furthermore, the goal of this paper was to estimate the level of susceptibility to framing by using *Resistance to framing* questionnaire. In each situation, the result ranged from 1 (resistance to framing) to 6 (least resistance to framing).

Table 2: Descriptive statistics for all situations used in Resistance to framing questionnaire

	Mean	SD	Median	Mode	Cumulative % of N with responses values of 1, 2 and 3
Pesticide	2,50	1,62	2	1	73
Tax law	3,08	1,63	3	2	60
Drop outs	2,88	1,58	2	2	66
Epidemics	3,02	1,50	3	2	64
Cancer	2,63	1,68	2	1	71
Capital market	2,97	1,39	3	2	66
Hospital	3,38	1,58	3	2	50
Total	2,92				64,29

The average level of resistance to framing was 2,92 ($x=2,92$, $sd=0,94$), indicating a tendency of susceptibility to framing effect. Since there was no middle value on the scale used for assessing resistance to framing, participants were “forced” into deciding about the direction of their answer. We present descriptive statistics for each of these situations separately in Table 2 to take a more detailed look into this construct. The last column refers to the percentage of responses that fit into “riskless” option.

Looking at the data in Table 2, it is interesting to notice that the most frequently occurring response values reflect a preference for riskless options. All median values are in the “riskless” part of the distribution. The average cumulative percentage of responses, indicative of a higher resistance to framing, reveals that 64% of our respondents are risk averse in the context of framing.

Table 3: Correlation coefficients between resistance to framing and decision-making styles

	Correlation coefficients
Vigilance	0,010
Hypervigilance	0,065
Defence avoidance	-0,039
Procrastination	-0,039
Buck-passing	-0,011
Rationalisation	0,063

To offer an answer to our third problem, we correlated the score on resistance to framing scale with the six decision-making styles. As shown in Table 3, there are no statistically significant correlations between the two variables. Taking into account our conclusion about low susceptibility to framing situations, it is reasonable to conclude that the absence of meaningful correlations between framing and decision-making styles might be related to the notion that the score on the framing questionnaire is not a valid correlator to rational thinking and/or this score is not a measure of irrational judgment. Furthermore, we found no significant correlations between the demographic variables and resistance to framing. The lack of meaningful results related to resistance to framing score must be interpreted with caution.

Table 4: Intercorrelations between resistance to framing/the style of decision-making and some investor's behavioural traits

		Framing	Vigil.	Hyperv.	Def. avoid.	Procrast.	Buck-pass.
Investor type	0,001	0,132	-0,162	-0,187*	-0,16	-0,12	-0,229*
Investor experience	0,073	-0,01	-0,152	-0,187*	-0,219*	-0,12	-0,247*
Investment market	0,013	-0,15	-0,236*	-0,187*	-0,269*	-0,14	-0,254*
Investment type	0,121	0,122	0,067	-0,018	0,027	0,034	-0,037

* $p < 0,05$

Correlation coefficients in Table 4 give us insight into the relationships between our variables of cognitive styles (resistance to framing scores and decision-making styles) and behavioural traits that describe investors from our sample. There are some interesting and significant correlations which we further tested using the ANOVA procedure. It seems that procrastination as a style of decision-making is significantly negatively related to the type of market investors are trading at, meaning that the investors trading only at the domestic market ($x=2$, $sd=0,71$) compared to those trading both at the domestic and foreign market ($x=1,6$, $sd=0,59$) have significantly higher scores on procrastinating decision style ($F=923,447$, $p < 0,05$). Similarly, investors trading at the domestic market ($x=2,4$, $sd=0,72$) have a significantly higher result on procrastination ($F=1248,00$, $p < 0,05$) than investors that trade on both markets ($x=2$, $sd=0,70$). The same direction of results can be found in relation to defensive avoidance, where domestic investors state higher level of this decision style ($x=2$, $sd=0,69$) than investors trading at both the domestic and foreign market ($x=1,7$, $sd=0,57$, $F=1027,633$, $p < 0,05$). Concerning hypervigilance, investors who trade only on the domestic capital market rely more on this style of decision-making ($x=2,5$, $sd=0,45$) than investors trading at both types of markets ($x=1,9$, $sd=0,53$; $F=4350,00$, $p < 0,05$).

With regard to rationalisation, individual investors are more prone to this type of decision-making ($x=2,4$, $sd=0,69$) than professional investors ($x=2$, $sd=0,57$; $F=2680,00$, $p < 0,05$), investors with 2 to 5 years of experience ($x=2,63$, $sd=0,55$) than investors with 5

years of investing experience ($x=2,43$, $sd=0,75$; $F=1013,00$, $p<0,05$) as well as investors who trade only on the domestic capital market ($x=2,4$, $sd=0,65$) when compared with the traders in the domestic and foreign market ($x=2$, $sd=0,62$; $F=3580,00$, $p<0,05$).

For the investor's experience variable, we found an inverse V shape relationship with procrastination and defensive avoidance style. It seems that investors trading between 2 and 5 years are the ones who promote these decision styles significantly more than investors with less than 2 years of experience and 5 or more years of investing experience (Table 5).

Table 5: ANOVA for variables investing experience and procrastination and defensive avoidance decision style

	Procrastination		Defensive avoidance	
Years of investing experience	X	SD	X	SD
Less than 2	1,9	0,76	1,8	0,74
2 to 5	2,2	0,69	2,3	0,55
More than 5	1,7	0,69	1,8	0,65
F	625,941	663,457		
p	0,005	0,007		

This result is interesting as it is hard to speculate about the reasons for this nonlinear relationship.

We found one more interesting correlation between investor type and decision avoidance as a decision-making style (Table 4). Results of ANOVA reveal that individual investors ($x=2$, $sd=0,70$) display a significantly higher avoidant decision-making style ($x=1,7$, $sd=0,57$, $F=812,724$, $p<0,05$). Taking into account that 71% of individual investors trade only at domestic the market and that 91% of traders that trade only at the domestic market are individual investors, we might conclude that investors with more years of experience, trading at both domestic and foreign markets and mostly professional investors exhibit a more complete and less biased style of decision-making.

Taking all the data into account, we could speculate that investors with more trading experience who trade at both the domestic and foreign markets exhibit a less biased and incomplete evaluation of information, since this is a correlate to these decision-making styles. Since trading at the foreign market requires facing more complex information, it is possible that investors who procrastinate less and do not avoid decision-making prefer a more demanding environment when it comes to the amount of information and, necessarily, a higher risk.

To sum up, although the dominant decision-making style of our sample of investors turned out to be a rational one, this result cannot be used as an argument in favour of investors' heightened rationality. In a study of decision-making styles of more than 2,000 students from all over the world, Mann et al. (1997) revealed that vigilance was the dominant style of decision-making. It seems that people see themselves as rational agents, but in reality they cannot exhibit the norm of rationality that great rational choice theory assumes. Additionally, lower results in resistance to framing and the lack of any meaningful correlates to this phenomena deserve more research attention. For now, it is only a measure of

contextual judgement and a proof of violation of the invariance and the dominance axioms of standard economic decision theory. Individual differences in decision-making styles we found in relation to investors' experience and the size of the markets they are trading in, enable only correlational conclusions. For more conclusive results on whether investing experience shapes rationality or a rational predisposition directs investing experience, we suggest experimental designs. This research study gives a piecemeal insight into some relations to rational behaviour.

For future research, we propose a greater and more representative sample of investors and the inclusion of more detailed information about investors' individual profiles.

CONCLUSION

The purpose of this paper was to examine certain individual traits of investors that trade in the Croatian capital market. The typical investor in this research was a 25- to 35-year-old male, individual investor with more than 5 years of experience in investing and trading mostly with shares in the domestic market. The self-assessed level of rationality was above average. The dominant style of decision-making presented by the sample of investors in this research study was vigilance, which overlaps with rational decision-making style and the self-assessed level of investor rationality. Meaningful and significant negative correlations between not-so-rational decision-making styles and certain individual characteristics indicate that more inappropriate decision-making styles can be found with individual investors (vs. professional), less experienced investors and investors who trade only in the domestic market. This finding could be correlated with a considerable volatility and insolvency in the domestic market. The results of Resistance to framing questionnaire showed a tendency of susceptibility to the framing effect but showed no meaningful relations to any other variable being measured. Investors in the capital market should bear in mind the framing effects and their decision-making style as it ultimately influences the financial performance of their investments.

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